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Production Capacity of the Soviet Cement Industry: 1975-83 (U)

Summary

This study presents a methodology for estimating the production capacity of the Soviet portland cement industry. Using this methodology, we analyzed a stratified sample of 36 of the 107 known operational cement plants in the USSR. The results of this analysis indicate that Soviet cement production capacity for 1983 was approximately 165 million metric tons. In addition, we estimate that cement production capacity in the USSR has increased by an average of only 1 percent a year since 1975. (S

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Soviet statistical reports state that 128 million metric tons of cement were produced in 1983. This figure includes 23 million tons of slag and fly ash additives. Subtracting these additives, we estimate that actual cement production was 105 million tons in 1983--only about 64 percent of the existing production capacity. (S

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Information available as of 1 March 1984 was used in this report. (U)

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IA M 84-10085

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The Soviets have been slow to incorporate new technology into the cement industry, and have experienced difficulties in implementing new technology where it has been applied. However, all Soviet cement plants constructed since 1975 use the more fuel-efficient dry production process favored worldwide. (S

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Introduction

The Soviet Union, the world's largest producer of cement, has 107 known operational cement plants[1], as shown on the map included in the appendix to this report. Cement is used extensively in Soviet construction, and according to published Soviet production statistics, the USSR's 1983 production of portland and other types of cement was 128 million metric tons, more than double the US production. An earlier research paper presents a detailed analysis of demand and supply factors affecting the Soviet cement industry, discusses Soviet plans to improve production, and assesses the prospects for cement industry growth.[2] This paper describes a methodology that can be used to estimate the actual current production capacity of the Soviet cement industry. (S [redacted] 25X1

The methodology presented in this paper applies formulas for estimating the capacity of individual cement plants to information derived from imagery. This methodology was applied to a stratified sample of the 107 operational plants to obtain an overall production capacity estimate for the entire Soviet cement industry. A map of these plants, along with a list of all known Soviet cement plants and production estimates for the sample plants, is presented in tables 1 and 2 in the appendix. (S [redacted] 25X1 25X1

Cement Production Processes

Cement is produced from a mixture of crushed limestone (calcium carbonate), clay or shale (silica and alumina), and a small percentage of iron ore or other material containing iron oxide. This mixture is calcined--heated to remove moisture--in rotary kilns, producing a marblelike material called clinker. The clinker is mixed with a small amount of gypsum (calcium sulfate) and ground to a fine powder to form cement. The amount of gypsum used in its production determines the cement's rate of hardening. Cement produced by this method is called portland cement, and accounts for most of the world's--and most of the USSR's--cement production. Portland cement is also mixed with additives of slag, from iron and steel plants, to produce portland slag cement; and with fly ash, from thermal power plants, to produce portland-pozzolan cement. (U)

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[1]An additional plant was under construction as of 1 March 1984.

[2]CIA. DI Research Paper SOV 84-10055 (Secret [redacted] 25X1 April 1984, The Soviet Cement Industry: A Case Study in Slowing Growth. (S)

The raw materials used to produce portland cement can be combined by two different processes. In the wet process, water is added to the crushed limestone and other materials to form a slurry that facilitates mixing (figures 1 and 2). This slurry is kiln-fired to clinker and then ground to powder. In the dry process, the raw materials are crushed, dried, and ground; they are mixed dry, and no water is added before the mixture is kiln-fired (figures 3 and 4). (U)

The wet process requires longer kilns and higher heat to evaporate the added water, but permits the use of lower-quality raw materials. The dry process requires high-quality raw materials, but is more energy-efficient. Its efficiency can be improved still further by preheating of the raw materials before they enter the kiln; this decreases the required kiln length. Sometimes hot waste gases from the kiln are used for preheating. Furnaces, called precalciners, can also be added near the bottom of the preheater to raise the kiln's production capacity. Dry-process kilns have been favored worldwide in plants built since the early 1970s, when energy costs skyrocketed. (U)

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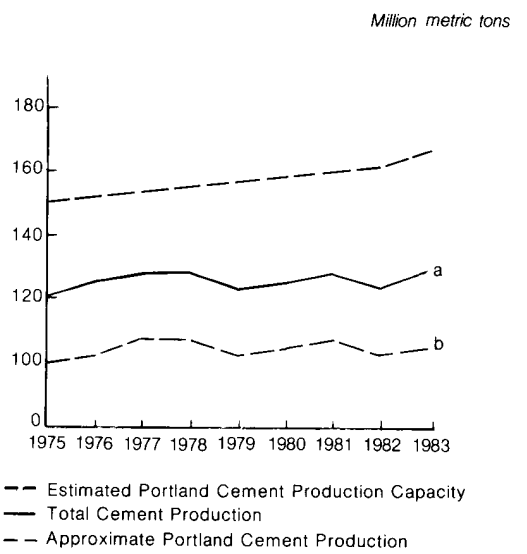
Development of the Soviet Cement Industry, 1975-1983

Using the estimating method described above, we calculate that the total Soviet portland cement production capacity in 1975 was 152,130,420 metric tons.[6] According to this estimate, Soviet cement capacity increased about 13,157,640 metric tons from 1975 to 1983--an average annual increase of only about 1 percent (figure 5). (S [redacted] 25X1 25X1

Only 10 kilns have been observed under construction at the sample cement plants since 1975, and only seven of these had been completed by the end of 1983. The large size of most new kilns may have contributed to this slow rate of construction. Two of the sample plants have been constructed since 1975, and six have been expanded. Both new plants, and four of the six under expansion, are large plants with production capacities of over 2 million metric tons a year. At Navoi and Spassk-Dalniy, the two new plants, all the kilns are identical; each kiln has a capacity of about 1.6 million metric tons a year. This uniformity suggests that the Soviets may be adopting this size and type of rotary kiln as the standard for new cement plants throughout the USSR. (S [redacted] 25X1

Another factor contributing to low growth in the cement industry has been the Soviets' slowness to incorporate new technology that could increase production capacity. A former Soviet engineer reports that a precalciner at Krivoy Rog, the first in the USSR, was scheduled to be operational in 1982--12 years after the

Figure 5
Comparison of Soviet Portland Cement Production Capacity and Actual Production



a Cement production is reported annually in Soviet statistical handbooks.
b Portland cement production is derived by subtracting 23 million metric tons (the amount of additives used in 1981 and used as an approximation for other years) from reported cement production.

Secret [redacted] 25X1

[6] Imagery from 1975 was available for only 25 of the 36 sample plants. Thus, there is a greater probability of error for the 1975 estimate of Soviet cement production capacity than for the 1983 estimate. (S [redacted] 25X1

precalcining process was introduced in Western plants. The Krivoy Rog precalciner was still under construction as of August 1982, when it was last observed. A kiln with a preheater has been removed at the Bezmein cement plant, further suggesting that the Soviets may have experienced some problems in incorporating preheater technology. (S [redacted] 25X1

The Soviets are known to have a program for increasing cement production capacity by modifying older rotary kilns. A Soviet technical journal reported that 59 older kilns were modified during the Ninth Five-Year Plan (1971-1975), and that the expansion program was continued through the Tenth Five-Year Plan (1976-1980). According to the same journal, these older rotary kilns were expanded by approximately 0.5 meter in diameter--a modification that would increase the production capacity of each kiln by 15 to 20 percent, depending on the kiln's diameter and length. Limitations in the quality and quantity of available imagery preclude estimation of the capacity change resulting from kiln modification. (S [redacted] 25X1

The Soviets are beginning to modernize their cement industry by adopting the dry process of cement production. Dry-process kilns use 40 percent less fuel than wet-process kilns, but require slightly more electricity than the older type. Overall, dry-process kilns reduce cement production energy costs more than 25 percent. Although the vast majority of Soviet cement plants use the wet production process, all Soviet cement plants constructed since 1975 use only dry-process technology, and incorporate preheaters. About 30 percent of the plants examined in this study have dry-process kilns. According to a Soviet engineer, however, only about 15 percent of the total Soviet cement output in 1980 was produced with the dry-process technology. (S [redacted] 25X1
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Appendix

Location of Known Soviet Cement Plants

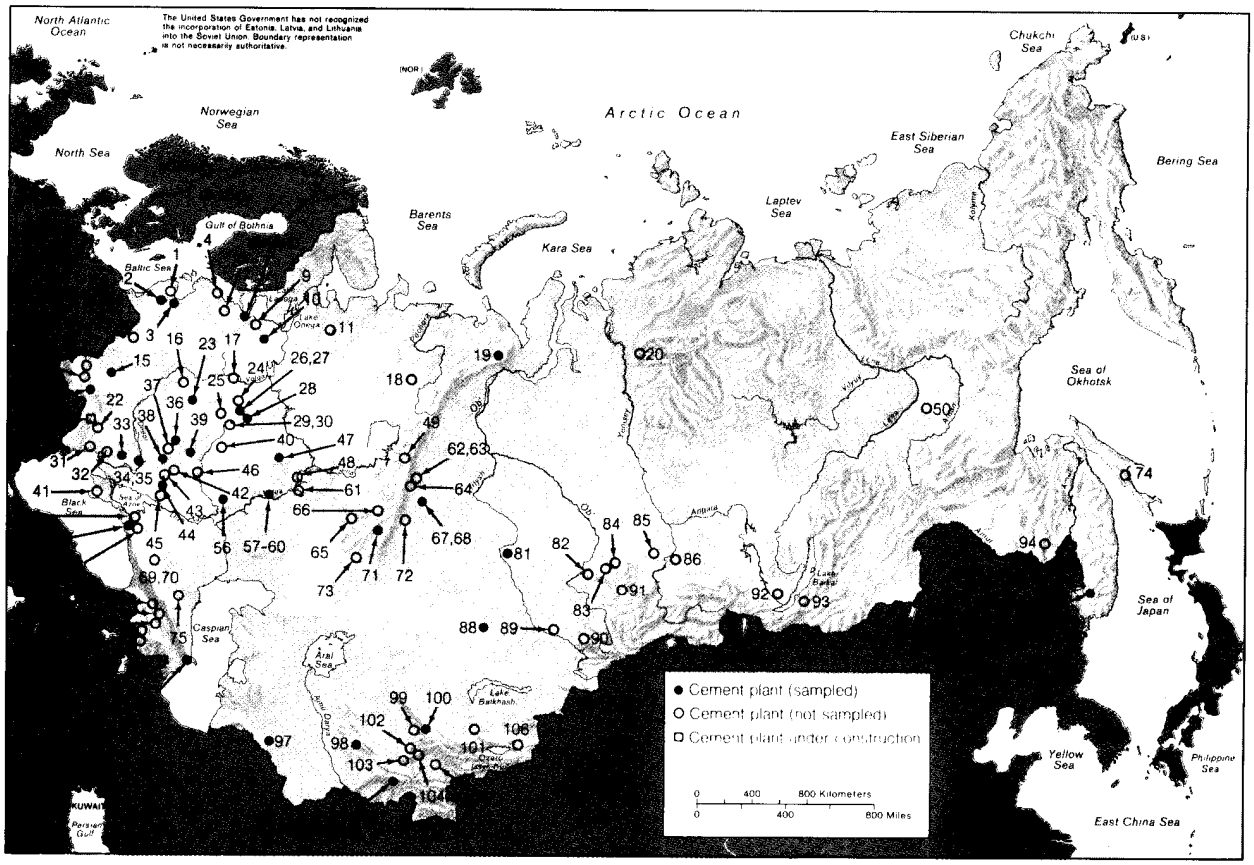

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Table 1
Known Soviet Cement Plants

Name	BE. Number and Coordinates	Key Number[a]	
Achinsk Cement Plant	[redacted] 56-13-37N 90-24-31E	85	25X1
Akhangaran Cement Plant	[redacted] 40-55-58N 69-39-03E	102	25X1
Aktau Cement Plant	[redacted] 50-14-12N 73-02-50E	88	25X1
Amvrosiyevka Cement Plant North	[redacted] 47-50-00N 38-28-36E	44	25X1
Amvrosiyevka Cement Plant South	[redacted] 47-48-06N 38-28-01E	45	25X1
Angarsk Cement Plant	[redacted] 52-36-34N 103-54-01E	92	25X1
Angren Cement Plant	[redacted] 41-01-30N 70-09-32E	104	25X1
Ararat Cement Plant	[redacted] 39-50-57N 44-42-29E	80	25X1
Bakhchisaray Cement Plant	[redacted] 44-46-24N 33-51-41E	41	25X1
Balakleya Cement Plant	[redacted] 49-29-40N 36-44-41E	38	25X1
Bekabad Cement Plant	[redacted] 40-12-57N 69-13-30E	103	25X1
Belgorod Cement Plant	[redacted] 50-36-39N 36-33-25E	37	25X1
Bestyakh Cement Plant	[redacted] 61-24-07N 128-57-55E	50	25X1
Bezmein Cement Plant	[redacted] 38-02-32N 58-12-07E	97	25X1

Footnotes appear at end of table.

Table 1
Known Soviet Cement Plants (continued)

Name	BE Number and Coordinates	Key Number[a]	
Broceni Cement Plant	[redacted] 56-41-32N 22-34-24E	1	25X1
Bryansk Cement Plant Fokino	[redacted] 53-26-41N 34-24-32E	23	25X1
Chimkent Cement Plant Lenin	[redacted] 42-17-34N 69-38-50E	99	25X1
Dneprodzerzhinsk Cement Plant	[redacted] 48-31-33N 34-35-02E	34	25X1
Dnepropetrovsk Cement Plant	[redacted] 48-29-12N 34-59-01E	35	25X1
Dushanbe Cement Plant 1	[redacted] 38-38-37N 68-46-11E	107	25X1
Dushanbe Cement Plant 2	[redacted] 38-38-13N 68-46-28E	108	25X1
Gornozavodsk Cement Plant Novopashiyskiy	[redacted] 58-23-34N 58-19-41E	49	25X1
Grigoryevka Cement Plant Olshanskiy	[redacted] 47-10-26N 31-45-29E	32	25X1
Groznyy Cement Plant Chir Yurt	[redacted] 43-04-36N 45-45-32E	75	25X1
Iskitim Cement Plant Chernorechenskiy	[redacted] 54-39-24N 83-18-30E	82	25X1
Ivano Frankovsk Cement Plant Yamnitsa	[redacted] 48-58-37N 24-42-39E	13	25X1
Kamenets Podolskiy Cement Plant	[redacted] 48-44-53N 26-36-15E	14	25X1

Table 1
(continued)

Name	BE Number and Coordinates	Key Number[a]	
Kamensk Cement Plant Temlyuy	51-59-44N 106-35-28E	93	25X1
Kant Cement Plant	42-54-50N 74-52-22E	101	25X1
Karadag Cement Plant	40-13-31N 49-33-35E	87	25X1
Kaspi Cement Plant	41-55-02N 44-25-02E	76	25X1
Katav Ivanovsk Cement Plant	54-46-56N 58-12-16E	66	25X1
Kharkov Cement and Reinforced Concrete Products Plant	49-57-55N 36-09-49E	36	25X1
Klin Cement Plant and Brickworks	56-20-25N 36-46-10E	17	25X1
Kolomna Cement Plant Shchurovo	55-03-40N 38-50-09E	28	25X1
Komsomolskiy Cement Plant Alekseyevskiy	54-26-40N 45-52-16E	47	25X1
Kramatorsk Cement Plant	48-43-52N 37-32-37E	42	25X1
Krasnoyarsk Cement Plant	55-58-36N 92-55-13E	86	25X1
Krichev Cement and Tile Combine	53-43-54N 31-43-24E	16	25X1
Krivoy Rog Cement Plant South	47-52-21N 33-26-19E	33	25X1

Table 1
Known Soviet Cement Plants (continued)

Name	BE Number and Coordinates	Key Number[a]	
Kunda Cement Plant	[redacted] 59-29-51N 26-31-44E	4	25X1
Kurmenty Cement Plant	[redacted] 42-47-52N 78-13-41E	106	25X1
Kuvasay Cement Plant	[redacted] 40-18-18N 71-58-40E	105	25X1
Leningrad Cement Plant V.V. Vorovskiy	[redacted] 59-53-22N 30-17-35E	6	25X1
Lipetsk Cement Plant	[redacted] 52-39-54N 39-37-53E	40	25X1
Magnitogorsk Cement Plant North	[redacted] 53-28-15N 58-58-58E	71	25X1
Mikhaylov Cement Plant South Spartak	[redacted] 54-12-54N 38-55-26E	29	25X1
Mikhaylov Cement Plant North Spartak	[redacted] 54-14-30N 38-53-04E	30	25X1
Mikhaylovka Cement Plant Sebryakovskiy	[redacted] 50-05-32N 43-14-19E	56	25X1
Naujoji Akmene Cement Plant	[redacted] 56-19-14N 22-55-03E	2	25X1
Navoi Cement Plant	[redacted] 40-03-20N 65-17-32E	98	25X1
Nevyansk Cement Plant	[redacted] 57-28-06N 60-08-37E	64	25X1
Nikolayev Cement Combine	[redacted] 49-31-12N 23-56-53E	12	25X1
Nizhniy Tagil Cement Plant North	[redacted] 57-57-14N 60-00-27E	62	25X1

Table 1
(continued)

Name	BE Number and Coordinates	Key Number[a]	
Nizhniy Tagil Cement Plant South	[redacted] 57-55-05N 60-02-37E	63	25X1
Norilsk Cement Plant	[redacted] 69-19-44N 88-11-57E	20	25X1
Novokuznetsk Cement Plant	[redacted] 53-47-37N 87-06-41E	91	25X1
Novorossiysk Cement Plant Gayduk	[redacted] 44-47-40N 37-41-37E	51	25X1
Novorossiysk Cement Plant Oktyabr	[redacted] 44-43-43N 37-49-25E	52	25X1
Novorossiysk Cement Plant Proletariy	[redacted] 44-44-10N 37-48-27E	53	25X1
Novotroitsk Cement Plant	[redacted] 51-13-07N 58-23-09E	73	25X1
Odessa Cement Plant	[redacted] 46-30-25N 30-40-33E	31	25X1
Oktyabrskiy Cement Plant	[redacted] 49-38-38N 83-34-28E	90	25X1
Omsk Cement and Concrete Products Plant	[redacted] 55-01-40N 73-28-15E	81	25X1
Pikalevo Cement Plant	[redacted] 59-31-47N 34-08-48E	10	25X1
Plesetsk Cement Plant Savinskiy	[redacted] 62-56-41N 40-11-38E	11	25X1
Podgornoye Cement Plant	[redacted] 50-23-41N 39-38-35E	46	25X1
Podolsk Cement Plant	[redacted] 55-27-31N 37-34-00E	24	25X1

Table 1
Known Soviet Cement Plants (continued)

Name	BE Number and Coordinates	Key Number[a]	
Poronaysk Cement Plant	49-13-14N 143-03-54E	74	25X1
Razdan Cement Plant Dznrarat	40-34-10N 44-44-44E	79	25X1
Riga Cement Plant	56-58-29N 24-04-56E	3	25X1
Rustavi Cement Plant	41-30-46N 45-02-43E	77	25X1
Rybnitsa Cement Plant	47-47-11N 29-01-04E	22	25X1
Rybnitsa Cement Plant Rezina[b]	47-47-00N 28-57-09E	21	25X1
Sastobe Cement Plant	42-32-58N 69-59-21E	100	25X1
Semipalatinsk Cement Plant Zhana Semey	50-23-58N 80-11-00E	89	25X1
Slantsy Cement Plant	59-06-47N 28-11-44E	5	25X1
Spassk Dalniy Cement Plant	44-34-33N 132-47-05E	95	25X1
Spassk Dalniy Cement Plant Novospassky	44-32-11N 132-45-20E	96	25X1
Staryy Oskol Cement Plant	51-15-35N 37-45-47E	39	25X1
Sterlitamak Cement Plant	53-39-47N 55-58-18E	65	25X1

Table 1
(continued)

Name	BE Number and Coordinates	Key Number[a]	
Sukhoy Log Cement Plant North	56-55-16N 62-01-32E	67	25X1
Sukhoy Log Cement Plant South	56-52-03N 62-03-12E	68	25X1
Tauz Cement Plant	40-59-48N 45-36-40E	78	25X1
Teploozersk Cement Plant	49-00-20N 131-53-40E	94	25X1
Topki Cement Plant	55-18-12N 85-35-37E	83	25X1
Tula Cement Plant Kosaya Gora	54-07-32N 37-33-22E	25	25X1
Ukhta Cement Plant	63-34-30N 53-46-08E	18	25X1
Ulyanovsk Cement Plant Kremenki	54-09-20N 48-21-35E	48	25X1
Ust Dzhegutinskaya Cement Plant No. 1	44-07-37N 42-00-39E	69	25X1
Ust Dzhegutinskaya Cement Plant No. 2	44-05-43N 42-00-25E	70	25X1
Verkhne Bakanskiy Cement Plant East	44-50-30N 37-40-43E	54	25X1
Verkhne Bakanskiy Cement Plant West	44-50-44N 37-40-07E	55	25X1
Volkhov Alumina and Aluminum Plant	59-54-43N 32-21-30E	9	25X1
Volkovysk Cement Plant 1 Krasnoye Selo	53-15-36N 24-25-58E	7	25X1

Table 1
Known Soviet Cement Plants (continued)

Name	BE Number and Coordinates	Key Number[a]	
Volkovysk Cement Plant 2 Krasnoselskiy	53-16-18N 24-26-34E	8	25X1
Volsk Cement Plant Bolshevik	52-03-06N 47-26-26E	57	25X1
Volsk Cement Plant Kommunar	52-00-35N 47-19-22E	58	25X1
Volsk Cement Plant Komsomolets	52-04-09N 47-30-06E	59	25X1
Volsk Cement Plant Krasnyy Oktyabr	52-01-02N 47-20-19E	60	25X1
Vorkuta Cement Plant	67-38-04N 64-04-06E	19	25X1
Voskresensk Cement Plant Gigant	55-15-25N 38-44-42E	27	25X1
Voskresensk Cement Plant Krasnyy Stroitel	55-16-24N 38-43-28E	26	25X1
Yashkino Cement Plant Krasnyy Stroitel	55-52-17N 85-25-29E	84	25X1
Yemanzhelinsk Cement Plant Pervomayskiy	54-52-17N 61-12-10E	72	25X1
Yenakiyevo Cement Plant	48-13-15N 38-14-34E	43	25X1
Zdolbunov Cement Plant Krasilov Chesnskiy	50-32-45N 26-15-40E	15	25X1
Zhigulevsk Cement Plant	53-25-18N 49-25-14E	61	25X1

[a]Key numbers correspond to locations on map.

[b]This plant was still under construction 25X1

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Table 2
Estimated Clinker Production Capacity of Sampled Soviet Cement Plants

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Name	Fuel Type[a]	Production Process	Preheater Type[b]	Annual Clinker Production Capacity[d] (metric tons)	Remarks
Plants With Annual Clinker Production Capacity of 2					
Aktau	Coal	Probably dry			Second [redacted] kiln with preheater in late stage of construction in Aug 83; probable completion in late 1983. Concrete plant nearby.
				364,000	
				364,000	
				364,000	
			Four-stage suspension	364,000	
				1,684,000	
				1,684,000	
Amvrosiyevka North	Gas/oil	Wet		3,366,000	No major changes between Feb 76 and Sep 82. Concrete products plant nearby.
				611,000	
				611,000	
				410,000	
				410,000	
				331,000	
				331,000	
				331,000	
				331,000	
Balakleya	Gas	Wet		3,814,000	No major changes between Jun 75 and Oct 83. Concrete products plant nearby.
				1,370,000	
				611,000	
				611,000	
				611,000	
				611,000	
Belgorod	Probably gas	Wet		2,583,000	No major changes between Apr 75 and Oct 83. Three concrete products plants nearby
				464,000	
				464,000	
				331,000	
				331,000	
				331,000	
				331,000	
				331,000	

Footnotes appear at end of table.

Table 2
Estimated Clinker Production Capacity of Sampled Soviet Cement Plants (continued)

25X1

Name	Fuel Type[a]	Production Process	Preheater Type[b]	Annual Clinker Production Capacity[c] (tons)	Remarks
Bryansk Fokino	Oil	Wet		4,153,000 562,000 331,000 331,000 274,000 274,000 274,000 274,000 611,000 611,000 611,000	One 5.0 x 185-meter kiln under construction in Dec 83; probable completion in late 1984.
Kamenets Podolskiy	Oil	Wet		3,946,000 751,000 751,000 611,000 611,000 611,000 611,000	Concrete products plant nearby.
Komsomolskiy Alekseyevskiy	Gas/oil	Wet/dry		3,900,000 611,000 611,000 611,000 611,000 364,000 364,000 364,000 364,000	No major changes between Aug 75 and Aug 83. Concrete products plant nearby.
Krivoy Rog South	Probably natural gas	Dry		766,000	One [redacted] kiln with with four-stage suspension preheater and precalciner, completed in early 83. Plant produces portland slag cement, using slag from nearby iron and steel plant.
			Probable grate	383,000	
			Probable grate four-stage suspension and pre-calciner	383,000	
				1,325,000	

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Table 2
(continued)

Name	Fuel Type[a]	Production Process	Preheater Type[b]	Annual Clinker Production Capacity[d] (tons)	Remarks
Mikhaylovka Sebryakovskiy	Coal/gas	Wet		2,635,000 464,000 464,000 611,000 274,000 274,000 274,000 274,000	Dust collection equipment added between Feb 76 and Sep 83. Concrete products plant nearby.
Naujoji Akmene	Oil	Wet		3,630,000 611,000 611,000 611,000 611,000 331,000 285,000 285,000 285,000	Concrete products plant nearby.
Navoi	Coal/gas	Dry	Four-stage suspension Four-stage suspension	3,368,000 1,684,000 1,684,000	Plant under construction in Jan 72; one kiln operating in Jul 77. Two kilns operating and one [redacted] kiln with preheater under construction in Aug 83: probable completion in late 1984.
Novorossiysk Proletariy	Gas	Wet		2,601,000 611,000 611,000 331,000 331,000 133,000 133,000 133,000 133,000 185,000	One additional 5.0 x 185-meter kiln under construction in Feb 84. Probable completion in mid-1984.

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Table 2
Estimated Clinker Production Capacity of Sampled Soviet Cement Plants (continued)

25X1

Name	Fuel Type[a]	Production Process	Preheater Type[b]		Annual Clinker Production Capacity[d] (tons)	Remarks
Spassk Dalniy	Oil	Dry			3,368,000	Nearby camps indicate forced labor used in construction.
Novospassky			Four-stage suspension		1,684,000	
			Four-stage suspension		1,684,000	
Staryy Oskol	Oil	Wet			3,666,000	One 5.0 x 185-meter kiln completed between Feb 76 and May 82. No major changes between May 82 and Dec 83. Concrete products plant nearby.
					611,000	
					611,000	
					611,000	
					611,000	
					611,000	
					611,000	
Sukhoy Log South	Oil	Wet			2,444,000	No major changes between Aug 75 and Jun 82.
					611,000	
					611,000	
					611,000	
					611,000	
Volsk Bolshevik	Oil	Wet			2,733,000	No major changes between Sep 76 and Jul 83.
					611,000	
					611,000	
					611,000	
					285,000	
					285,000	
					110,000	
					110,000	
					110,000	
Zdolbunov	Gas/oil	Wet			2,132,000	No major changes between Sep 76 and Sep 82. Three [redacted] kilns with apparent dewatering devices. Concrete products plant nearby.
Krasilov					464,000	
Cheshskiy					464,000	
					464,000	
					185,000	
					195,000	
					185,000	
					185,000	

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Table 2
(continued)

Name	Fuel Type[a]	Production Process	Preheater Type[b]	Annual Clinker Production Capacity[d] (tons)	Remarks
Plants With Annual Clinker Production Capacity of Les					
Angarsk	Coal/gas	Probably dry		1,456,000 364,000 364,000 364,000 364,000	No major changes between Dec 75 and Jan 84. Concrete products plant nearby.
Bezmein	Probably gas/oil	Dry		1,300,000 120,000 120,000 364,000 313,000	One 4.0 x 150-meter kiln constructed in 1978-79. Kiln with probable grate preheater dismantled by Sep 82. Kiln with preheater under major repair in Dec 82.
			Four-stage suspension	383,000	No major changes between Dec 82 and Feb 84. Concrete products plant nearby.
Dushanbe 1	Oil	Wet		156,000 78,000 78,000	Dismantlement of one of two slurry tanks and extra equipment near kilns suggest that plant may be converted to dry process. Concrete products plant nearby.
Dushanbe 2	Oil	Wet		740,000 185,000 185,000 185,000 185,000	Concrete products plant nearby.
Karadag	Oil	Wet		1,935,000 611,000 331,000 331,000 331,000 331,000	One kiln partially dismantled in Sep 82, repaired and operating by Sep 83.

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Table 2
Estimated Clinker Production Capacity of Sampled Soviet Cement Plants (continued)

25X1

Name	Fuel Type[a]	Production Process	Preheater Type[b]	Annual Clinker Production Capacity[d] (tons)	Remarks
Kolomna Shchurovo	Probably gas	Wet		1,598,000 611,000 611,000 110,000 110,000 78,000 78,000	Additional stack and dust collection equipment built near two kilns between Aug 69 and Sep 82. No major changes between Sep 82 and Dec 83. Dec 83. Concrete products plant nearby.
Magnitogorsk North	Probably gas	Probably dry		939,000 313,000 313,000 313,000	Plant produces portland slag cement, using slag from nearby iron and steel plant. Stack and dust collection equipment added since Jun 75.
Novorossiysk Oktyabr	Gas	Dry		1,456,000 364,000 364,000 364,000 364,000	Storage buildings added between Jul 75 and Feb 84.
Pikalevo	Oil	Dry		1,887,000 509,000 509,000 509,000 120,000 120,000 120,000	No major changes between Sep 76 and May 82. Concrete products plant nearby.
Riga	Probably gas	Probably wet		330,000 110,000 110,000 110,000	No major changes between Jun 81 and May 83. Concrete products plant nearby.
Sastobe	Probably coal	Wet		662,000 331,000 331,000	

Table 2
(continued)

25X1

Name	Fuel Type[a]	Production Process	Preheater Type[b]	Annual Clinker Production Capacity[d] (tons)	Remarks
Spassk Dalniy	Coal/oil	Dry		1,555,000	
			Four-stage suspension	383,000	Dust collection equipment added to one kiln between Nov 76 and Mar 84. Concrete products plant nearby.
			Four-stage-suspension	383,000	
			Four-stage suspension	383,000	
				203,000	
				203,000	
Sukhoy Log North	Gas/possibly coal	Probably wet		440,000	No major changes between Aug 75 and Jun 82. Concrete products plant nearby.
				110,000	
				110,000	
				110,000	
				110,000	
Volsk Kommunar	Oil	Probably wet		266,000	No major change between Sep 75 and Jul 83.
				133,000	
				133,000	
Volsk Komsomolets	Oil	Probably wet		78,000	
		One covered kiln, approximate length 50 meters		78,000	

Table 2
Estimated Clinker Production Capacity of Sampled Soviet Cement Plants (continued)

25X1

Name	Fuel Type[a]	Production Process	Preheater Type[b]		Annual Clinker Production Capacity[d] (tons)	Remarks
Volsk Krasnyy Oktyabr	Oil	Probably wet			340,000	Dewatering device or one-stage suspension preheater added to
					78,000	kiln between
					78,000	Sep 75 and Jul 83.
					53,000	
					53,000	
					78,000	
Vorkuta	Gas/coal	Probably wet			440,000	Concrete products plant nearby.
					110,000	
					110,000	
					110,000	
					110,000	
Voskresensk Gigant	Probably gas	Wet			1,102,000	No major changes between Jun 75 and and Dec 83.
					285,000	Concrete products plant
					285,000	nearby.
					133,000	
					133,000	
					133,000	
					133,000	
Voskresensk Krasnyy Stroitel	Gas/coal	Wet			715,000	No major changes between
					331,000	Jun 75 and Dec 83. Concrete
					274,000	products plant nearby.
					110,000	

25X1

[a]Unless storage facilities for coal or oil are not present, it is difficult to determine from overhead imagery whether a plant uses natural gas for fuel. Natural gas is widely available in the USSR, and is used at many of the 107 operational Soviet cement plants.

[b]The production capacity of a kiln with a grate preheater is calculated to be the same as that of a kiln with a four-stage suspension preheater.

[c]Kiln diameter is measured at discharge end.

[d]Figures for plants using slag or fly ash additives reflect increased cement production capacities.

[e]Not available; accurate measurements could not be determined.

This table is Secret

25X1